

THE A.P.R.O. BULLETIN

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VOL. 23, NO. 3

TUCSON, ARIZONA

NOVEMBER – DECEMBER 1974

Robots In Quebec, Canada

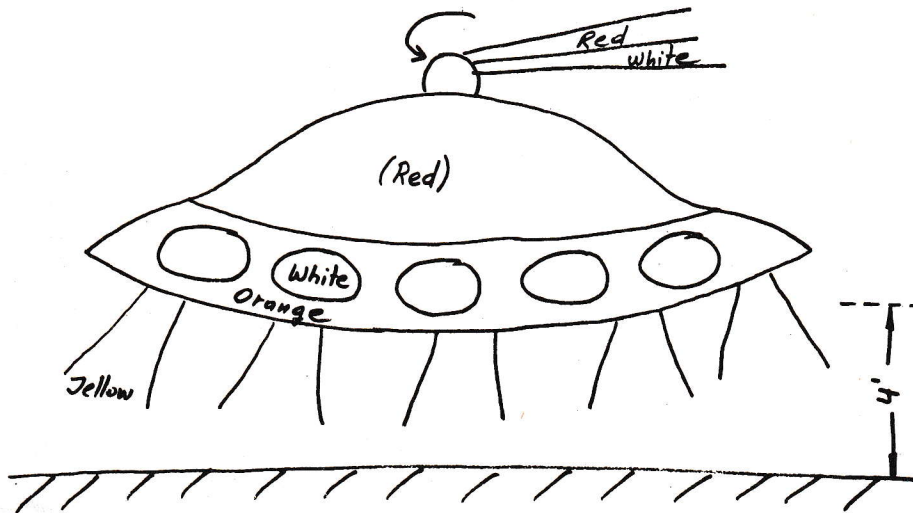
Our thanks to Field Investigator Wido Hoville for the following excellent and very strange report: Mr. and Mrs. L. had come home from a holiday in Florida during the evening of July 22, 1974. Being tired from the trip, Mrs. L. had gone to bed and her husband was sitting up watching the late show on television. They live in a house trailer near St. Cyrille, Quebec. Other trailers on the lot had been installed but the L.s were the only occupants at the time.

Shortly after the end of the show at about 1:15 a.m. on the 25th, Mr. L. was preparing to go to bed when he heard a strange sound like "bum bum bum" outside, much like something falling on the grass. He lifted the curtain in the living room and saw a reddish-orange round object hovering over the field to the northeast side of his house trailer. He then went into the bedroom to wake his wife and while there heard another sound like buzzing and when he looked outside he saw what he described as a robot like creature, about 6 feet tall, within 15 feet of the trailer.

Needless to say, Mr. L. was shocked by what he saw and he and his wife then went into the living room where they looked out and observed three more "robots" (they described them as such because of their stiff manner of moving about, as well as their appearance) close to an adjoining trailer and apparently examining the shaft and wheel assembly. From then on, Mr. and Mrs. L. only looked out occasionally to see if the "robots" were still there and because they were very frightened. During the observation, which lasted until 4:20 a.m., they both saw approximately 15 of the robots together in one line close to the creek. The robots stood there for over 5 minutes and when they moved they moved as if one unit, giving the L.s the impression that they were remote-controlled.

During the following few days, the L.s learned that a farmer had trouble with his dog on the morning after the incident. The dog, which usually barked wildly at the slightest provocation, had managed to slip out of his collar and was hiding.

Although only one object was seen, three of what could be landing traces
(See Robots – Page Three)



Drawing of St. Cyrille object – See Column Three

That NBC Special

This issue of the *Bulletin* is quite late because of the influx of mail and telephone calls as a result of the airing of the NBC News Special on UFOs on the evening of December 15. The program was broadcast at 9 p.m. Tucson time and when it was over, both telephones (the Lorenzen home phone and the office extension) began ringing and both Mr. and Mrs. Lorenzen were pressed into answering calls until 12 midnight when both were taken off the hooks. When the phones were reinstated at 8:30 a.m. the next morning, the calls continued. They consisted of individuals asking for information about joining APRO, as well as calls from various radio and TV stations across the continent asking to set up for telephone interviews.

The mail as a result of the show began to come in on Thursday – a trickle at first, but increasing until on December 24 the mail count was 150 pieces as opposed to the usual average of 50 pieces per day.

Many of the letters requesting membership were addressed to APRO, Tucson, Arizona, or "UFO Headquarters." Some individuals
(See NBC – Page Nine)

Santa Catalina Filmclip

By R. Michael Rasmussen

A newly discovered filmclip showing a clearly defined disc-like object in flight was shown at the September 20, 1974 meeting of the San Diego UFO Research Organization (SDUFORO), a group closely affiliated with APRO.

The filmclip, lasting about 11 seconds, was shot on April 15, 1966 at 9:30 a.m., from a helicopter flying a few miles south of Santa Catalina island, off the Southern California coast.

The photographer, who prefers to remain anonymous to protect his professional standing, was sitting in a special seat at one side of the helicopter, preparing to take motion pictures of underwater demolition exercises, when he first noticed the UFO. He didn't pay immediate attention to it, however, because at first he thought it was only a blimp.

Several factors changed his mind. For one thing, after several minutes of observation, both the helicopter and the UFO had changed directions slightly, allowing for a variety of viewing angles. At all times, despite the changes in angles,
(See Catalina – Page Nine)

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Rasmussen Named Assistant Editor



R. Michael Rasmussen, formerly Editor and Publisher of *The UFO Reporter*, based in San Diego, California has accepted appointment as Assistant Editor for the *APRO Bulletin*.

Mr. Rasmussen, whose picture is shown above, completed his A.A. Degree and graduated from Grossmont College, El Cajon, California, is currently working on a B.A. degree in Social Science at San Diego State University with a minor in journalism, with a Master's degree at the same University his ultimate goal.

Mr. Rasmussen is a member of the San Deigo UFO Research Organization and a member of the National Amateur Astronomers, Inc.

His interests are in virtually all aspects of the UFO phenomenon, but particularly in witness credibility and problems of elimination of misinterpreted natural and man-made phenomena from UFO case files. He is also interested in the application of scientific method to study UFOs, history and "lore" of UFO enigma, search for meaningful statistical patterns to prove or disprove UFO reality, physical detection of UFOs, collecting UFO titles of all types, writing articles and publishing UFO information, and he is currently working on the manuscript for a book with the projected title, *THE UFO CHALLENGE - SCIENCE ON TRIAL*.

APRO is happy to welcome such a talented young man to its staff and we are sure the membership will enjoy his many contributions to the *Bulletin* in the future.

22 Years Ago In The Bulletin

The RECENT SIGHTINGS column of the January, 1953 *Bulletin* carried the following interesting information about a sighting over northern Japan:

Mysterious flying objects - rotating clusters of red, white and green lights have been sighted over northern Japan by American airmen, the Air Force disclosed Wednesday (January 21). Sighted close to Russian territory in the Kurile Islands and Sakhalin, the "flying clusters" were seen by fighter pilots and ground personnel and were tracked on radar. The Air Force release stated that "there were too many indications of the presence of something to be considered an observation of nothing" and discounted the possibility that they were "reflections of light."

The lights hung motionless at times, and at other times disappeared at blinding

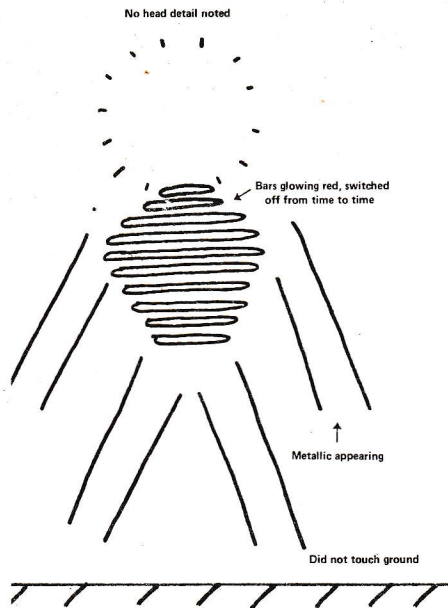
speeds. Col. Donald J. M. Blakeslee, World War II ace and commander of an escort fighter wing, took detailed observations on one rotating cluster and tried in vain to intercept it in a jet while on night flight on December 29, 1952. He closed on the object after extinguishing all lights on his aircraft to make certain he was not getting some reflection from the canopy surface. There was no change in the object's brilliance or appearance after his lights were put out. It increased speed and disappeared from sight in 30 seconds. On the same night the clusters were seen by two crew members of an F-94 interceptor for 40 minutes, by two members of a B-26 for 5 to 7 minutes and by five different airmen on the ground. Ground observers said the objects were "circular ferris wheels" or disk-shaped objects with rotating red, green and white lights. The ground observers watched them for from 30 minutes to three hours.

Correction to *APRO Bulletin* July-August 1974, Page 8, Col. 3, article by D. H. Harris ... Line 11 should read:

are so long that the atmosphere can act as a waveguide. At particular frequencies in this range, the atmosphere

Robots

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were found. One was where the witnesses observed the object, the others on the other side of the creek, hidden by high bushes which would have screened anything from the L's view. Since the sighting, when Mr. Hoville's investigation was made, the grass had been cut on both sides of the creek but the landing marks were clearly seen because the grass had grown twice as high in the area of the marks as in the surrounding area. The grass in the landing areas was not burned, but merely swirled as in the cases of other so-called "saucer nests" around the world.

According to the witnesses, they found a strange substance of whitish color where the robots were seen moving about, and close to their pre-fabricated shed. A sample is with Dr. Walker, APRO's Consultant in metallurgy and if analysis yields anything pertinent to the report, it will be included in our **Follow-Up** column in a future issue. Members must keep in mind that such analysis is done on a volunteer basis and that all of our consultants have positions in industry or education which have to take priority over APRO work; therefore, results may not be immediately forthcoming. Also, since the beginning of the fall, 1973 "flap," many samples of various kinds have been forwarded to Headquarters and lab work is always slow in yielding results.

See the accompanying sketches of the robot and the landed craft.

An Analysis Of The Fish Model

By Walter N. Webb

(Mr. Webb is Consultant in Astronomy for APRO.) Continued from the Sept.-Oct. Bulletin.

(3) Single stars are more likely than multiple stars to have habitable planets. Binary stars, for example, could perturb planets into unstable orbits although such effects would depend upon how closely separated the stars were in the system. The problem is a complicated one, but at present it seems best to favor single stars over multiple systems as better prospects for life.

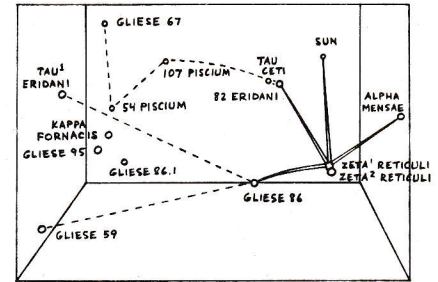
(4) Massive O to early F stars tend to have high rotational speeds (100-230 km/sec) with an abrupt slowdown occurring between F2 and F5, decreasing to only a few km/sec in G stars like our sun. Such slow rotations may indicate planets are absorbing the angular momentum of the star from early F through M. If this is true, it is interesting that the emergence of planetary systems coincides with the estimated cutoff for spectral types suitable for life.

Ms. Fish restricted her selection of stars even further, confining her search ultimately to only single, nonfluctuating, main sequence stars between F8 and K1 — her "Group 1" stars, those with the best chance for producing terrestrial planets with intelligent life. (According to Sagan, F8 is the point where intelligence may emerge.) She reasoned that if the Hill story were true and extraterrestrials visited our solar system and the earth, other stars similar to our sun should be of interest to them. In fact, by reversing the argument, it also was likely their origin star was similar to our sun. Marjorie discovered that about 200 stars within 22 parsecs (72 light years) of the sun lie in the F8-K1 spectral range.

Marjorie Fish's six-year search yielded only one unique three-dimensional duplicate of Betty Hill's star map, and a continuing inspection since then has not uncovered any pattern remotely resembling the original discovery. The match-up includes not only the 12-star network connected by lines but also three background (actually foreground) stars that formed a prominent triangle in Mrs. Hill's drawing.

The stars that make up the pattern in the Fish model fulfill the above exobiological criteria. For example, the lines in the map connect stars that are exclusively the type defined as suited for life. All 12 stars are single, nonfluctuating, slowly rotating dwarfs residing on the main sequence for lifetimes of from about seven to 30 or 40 billion years, ample time for the evolution of life to take place. Tau Ceti

seems to be a special borderline case. It has been listed either as lying between the main-sequence dwarfs and subdwarfs or as a subdwarf. Sagan believes full-fledged subdwarfs would not likely possess terrestrial planets although they might have Jovian-type gas giants orbiting them.



Front view of Fish Model. Compare with Betty Hill's map. From photo by M. E. Fish with lines from Hill map added.

The pattern stars range from F6 to K1. All 12 are "Group 1" stars (having terrestrial planets with intelligent life) except Tau¹ Eridani, which is F6. This latter star is a member of Ms. Fish's "Group 0," stars possibly possessing terrestrial planets with *nonintelligent* life. Marjorie feels such bodies would be suitable for colonization or the establishment of bases. One of the most striking features is that *eight of the 12 stars are G types, probably the optimum range for intelligent life*. The so-called "base stars," Zeta¹ and Zeta² Reticuli, are included in this category; they are G2 and G1, respectively. It should be emphasized the two stars are not components of a binary system (they share a common motion through space) and therefore fulfill the single-star requirement for life. Both bodies are quite similar to our sun (G2) in mass, temperature, luminosity, and residence time on the main sequence. Marjorie, it will be recalled, assumed from the beginning that the home star of the Hills' abductors probably would resemble our sun and that they would seek out stars similar to theirs.

Especially noteworthy is the fact that the pattern happens to contain a phenomenally high percentage of all the known stars suitable for life in the solar neighborhood. Employing her own critical standards, Ms. Fish found only 12 (5%) of 259 known stars within her 10-parsec model that were suitable for life; five of the 12 (42%) occupy positions in the Hill pattern (six, if we include the occulted Zeta Tucanae)! Interestingly enough, when multiple stars, probable variable stars, and stars later than K1 are removed from Sagan's list of 20 nearest stars (and Dole's list of 14 stars) most likely to have habitable planets within 6.7

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Analysis

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parsecs (22 light years), only two stars meet Marjorie's stringent requirements — Tau Ceti and 82 Eridani — and both are in the Hill pattern! (The former object has been the target of at least four radio-telescope searches for artificial signals.)

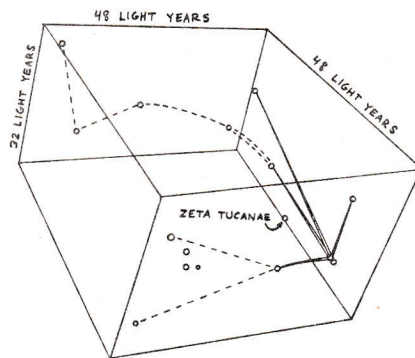
The star pattern fills a volume of space determined by Marjorie to be 48 light years (14.7 parsecs) wide by 48 light years deep by 32 light years (9.8 parsecs) high (+ 1½ light years per side) — a two-thirds cube. *This volume actually contains over 100 stars and yet all the stars within the volume compatible with life are included in Betty Hill's drawing.* This would hardly seem coincidental.

The solid and broken lines allegedly representing trade routes and expeditions do indeed depict a logical travel sequence from star to star. The routes link Zeta¹ Reticuli with only the nearest stars having spectral classes that favor the emergence and evolution of life — especially intelligence. For the reasons cited previously, all other stellar types appear to be avoided: fast-rotating stars earlier than F2, stars later than K1, multiples, and variables.

Concerning discrepancies between the drawing and the model, Ms. Fish feels, and I tend to agree, that these differences are relatively inconsequential and can be justified in a reasonable manner. The drawing, as mentioned earlier, was created under post-hypnotic suggestion, and a comparison with the model demonstrates what would appear to be astonishing accuracy in recalling forgotten details. During a moment of conscious control, Betty erased the Zeta¹ Reticuli-Gliese 86 line twice before settling on the wrong position. *The longest erasure appears to be the correct angle for the Zeta¹ Reticuli-Gliese 86 line while the short erasure is the correct length.* Improving the angle would also correct the angle of the line to Alpha Mensae on the opposite side of Zeta¹.

Both Zeta¹ and ² Reticuli are large and widely separated in the drawing probably, according to Ms. Fish, because (1) the two stars were located very near the map's front surface and (2) they may have been deliberately dramatized by using a larger scale (on the original map).

Mrs. Hill's representation of the background triangle (stars Gliese 86.1, 95, and Kappa Fornacis) is larger than the one in the model. Marjorie believes it was drawn larger because it is near the front surface of the map and would have been quite prominent. Moreover, the shape would have been relatively easy to recall in contrast to most of the other background stars. Indeed, the other objects were included by Betty simply to show there was a backdrop of other stars.



Oblique view of Fish Model. From photo by M. E. Fish.

Marjorie is satisfied any residual differences between the drawing and model can be explained plausibly as due to (1) Betty Hill's recall and sketching ability and (2) to the possibility of somewhat incorrect star positions in the model owing to still inexactly known parallaxes (by which the distance to each star is calculated).

PROBABLE STARS IDENTIFIED BY FISH IN THE HILL MAP

Name	SAO Catalog Number	Gliese Catalog Number	Constellation	Spectral Class	Distance From Earth (L. Y.)
Zeta Tucanae	248163	17	Tucana	G2 V	23.3
54 Piscium	074175	27	Pisces	K0 V	34.3
—	167134	59	Cetus	G8 V	52.6
—	037434	67	Andromeda	G2 V	37.5
107 Piscium	074883	68	Pisces	K1 V	24.3
Tau Ceti	147986	71	Cetus	G8 Vp(or VI)	11.8
—	232658	86	Eridanus	K0 V	36.6
—	167613	86.1	Fornax	K2 V	42.3
—	167697	95	Fornax	G5 V	44.7
Kappa Fornacis	167736	97	Fornax	G1 V	42.3
Tau ¹ Eridani	148584	111	Eridanus	F6 V	46.6
Zeta ¹ Reticuli	248770	136	Reticulum	G2 V	36.6
Zeta ² Reticuli	248774	138	Reticulum	G1 V	36.6
82 (e) Eridani	216263	139	Eridanus	G5 V	20.2
Alpha Mensae	256274	231	Mensa	G5 V	28.3
Sun	—	—	—	G2 V	—

An important piece of evidence uncovered by Ms. Fish, strongly suggesting the map is not a hoax, is the fact that the background triangle could not have been drawn prior to the publication of the 1969 edition of Gliese's "Catalog of Nearby Stars." Not only was the star Gliese 86.1 not listed, so far as is known, in any (earthly) star catalog in 1964 when Betty drew her map, but also Gliese 95 and Kappa Fornacis, their parallaxes imperfectly known in 1964, would not have created the triangle Betty drew on the map. I checked this out myself in several of the catalogs Marjorie used and confirmed the accuracy of her discovery.

In addition, it is improbable Mrs. Hill could have devised a pattern of 12 stars,

all of which would turn out to be candidates for life; it is improbable she could have had access to the proper star catalogs; and even if she had located the catalogs, it is improbable she knew how to interpret them. As the initial investigator of the Hill affair, I happen to know Betty's knowledge of astronomy is severely limited.

The 12 stars connected by lines have the following ranges as a group: spectral classes F6 V to K1 V (sun G2 V), surface temperatures about 4800 to 6500° Kelvin (sun 5800°), masses about 0.7 to 1.2 solar masses (sun 1.0), luminosity about 0.3 to 2.1+ (sun 1.0), radii about 0.7 to 1.2 solar radii (sun 1.0), absolute visual magnitudes +3.7 to +5.9 (sun +4.8), apparent visual magnitudes +3.5 to +7.0 (sun -26.7), distances from earth 11.8 to 52.6 light years, and main-sequence residence times about 7 to 30 or 40 billion years (sun about 13 billion).

All but one (Alpha Mensae) of the 12 pattern stars can be seen from parts of the United States in the winter evening sky or late summer morning sky. Zeta¹ Reticuli, the probable origin star, is a faint fifth-magnitude star located in the tiny, undistinguished,

southern-hemisphere constellation known as Reticulum the Net and is visible in the United States only from the southern tip of Florida and Brownsville, Texas. Under favorable conditions nine, and possibly 11, of the 12 stars are detectable with the naked eye. The remainder require binoculars.

A SCENARIO OF EXPLORATION FROM ZETA¹ RETICULI

Based upon data from the Fish model, the star map, and Betty and Barney Hill's testimony of their UFO encounter, I believe it is feasible to construct a speculative but rational scenario of interstellar exploration from the alleged origin star, Zeta¹ Reticuli. It was felt Ms. (See Analysis — Page Five)

Analysis

(Continued from Page Four)

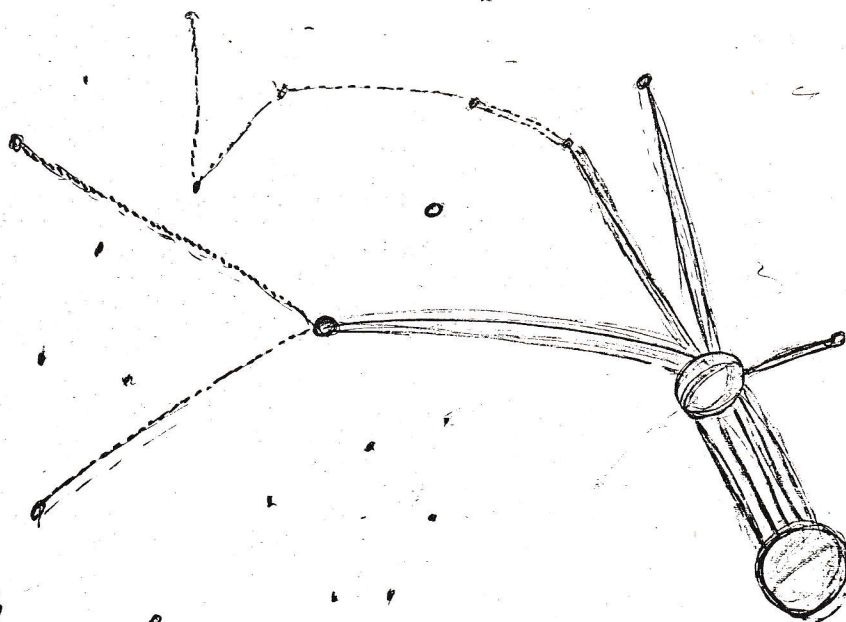
Fish's careful research supplied enough usable scientific data to justify such an exercise in subjective probability.

We have already seen how similar Zeta¹ Reticuli is to our own sun in its spectral characteristics although we have no way of knowing at present exactly how long the former body has been on the main sequence. From both the star's spectrum and the Hills' description of their captors, it may be assumed the home planet of the hypothetical "Zeta Reticulans" possesses a mass, gravity, and environment at least somewhat like our own. Bieri (1964) argued extraterrestrial intelligence probably will resemble *Homo sapiens* because evolutionary pathways are strictly limited and air-breathing, land-roaming humanoids offer the optimum adaptive solution to terrestrial environments. He postulated life-supporting planets will evolve bilaterally symmetrical animals with an anterior brain and closely associated sense organs, paired appendages, and hands for tool-making. Variations in atmospheric density and composition, stellar distance, and radiation output and intensity from the star would account for the reported appearance of the Hill entities: large slanted eyes, wide nostrils, mouth-slit, gray skin, and thick chests.

Although it is impossible to tell how long this race may have been conducting interstellar spaceflight, it is obvious from the Hill map that it has been a spacefaring society for a very long time. Participants at the 1971 Byurakan conference on communication with extraterrestrial intelligence (CETI) estimated the lifetimes of such civilizations which do not destroy themselves as ranging from perhaps 10,000 to one billion years (Sagan's value was 10 million years).

Since interstellar exploration would doubtless be an expensive venture, it is entirely conceivable the Reticulans are members of a linked community of intelligent species possibly composed not only of various cultures contacted in planetary systems represented on the Hill map but also embracing other societies as well. Participation in such a "galactic federation" would bestow definite advantages: a galactic heritage of knowledge about innumerable planets, their histories, and the life forms that evolved on them; a detailed astronomical record of the origin, history, and probable fate of the universe, some of the data perhaps originally acquired by long dead civilizations; the development of sciences not easily contrived by one civilization alone but achievable through combined efforts; and the transfer of information that would help extend the life expectancy of participating societies.

When the Reticulans mastered the



Betty Hill's Star Map

principles of relativistic spaceflight, their first expedition must have been a rather easy hop to neighboring Zeta², a yellow dwarf star much like their own. Ms. Fish assigned limits of about 1/20th to 1½ light years separation between the two stars – about 470 billion to 14 trillion kilometers. (This distance may be compared to that of the sun's nearest stellar neighbor, the Alpha Centauri triple system – 4.3 light years or about 41 trillion kilometers from earth.) From the many lines running between the two stars on the Hill map, it seems likely contact was established with another intelligent race on a planet (or planets) orbiting Zeta² and the consequence was what appears to be a heavy commerce between the two solar systems. We might further speculate that the unusually close proximity of another star to the origin star could have provided the impetus for additional deep-space explorations. (The average distance between stars in the solar neighborhood is about eight light years.)

Undoubtedly, other nearby stellar candidates were monitored for the likelihood of intelligent life and were eventually visited, ultimately leading to voyages along five or six branches of stars – those in the Hill map. The next logical planetary system to receive a visit from the Reticulans probably was Zeta Tucanae, another G2 dwarf like Zeta¹. (While this star was occulted from Betty Hill's vantage point, it would be surprising if it were not part of the Reticulan network.) Although the distance from the origin star to Gliese 86 is estimated by Marjorie to be only 9.8 (+2) light years, the latter is a KO type star. Zeta Tucanae was several light years

further but a more promising candidate for the emergence of intelligence.

Alpha Mensae, a G5 dwarf 14 (±2) light years distant, probably became the next target followed by 82 Eridani, another G5 sun 19 (±2) light years from the home star. The sequence of travel after the latter star grows more problematical and depends upon many unknown factors including whether single or simultaneous expeditions to various stars were launched from Zeta¹ Reticuli. In any case, we might conjecture that solid lines to Alpha Mensae, 82 Eridani, our sun, Gliese 86, and quite possibly Zeta Tucanae indicate repeat trips to planets of extraordinary interest orbiting those stars. (Communication with, or observation of, intelligent cultures on the worlds visited could be an important reason for return trips but certainly not the only aim.)

Ms. Fish has proposed a very logical explanation for the existence of two dashed lines between 82 Eridani and Tau Ceti (G8 type): the first expedition to arrive at the latter star used it as a jump-off point to our own sun, the next G2 dwarf beyond Zeta Tucanae and of the same spectral type as the home star itself. From Tau Ceti the choice was either the sun or 107 Piscium, a lesser K1 prospect five light years more distant than our star. After the sun and earth were visited, the dashed line from Tau Ceti to the sun was eliminated in favor of a direct link between the home star and the sun, the longest single traverse to another star from Zeta¹ Reticuli (36.6 light years, one way).

Employing the time-dilation paradox, (See Analysis – Page Six)

Analysis

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a one-way trip from Zeta to the sun might take about 11 years at a constant one-gravity (normal earth weight) acceleration and deceleration near the velocity of light. However, this interval could be cut in half at two- or three-g accelerations and reduced even further if higher forces could be tolerated. Obviously, whatever the propulsion mode, the earth and its inhabitants appear to be a priority objective, not only of the Reticulans but also apparently of other humanoid races in spite of the sun's relative isolation on the edge of a 30-light-year-diameter gulf nearly devoid of stars, one of the many facts disclosed by the Fish model.

Eventually, another expedition, according to Ms. Fish's supposition, proceeded from 82 Eridani to Tau Ceti, accounting for the second dashed line between the two stars, and then probably continued to 107 Piscium.

If we continue our hypothetical exercise, it is apparent other branches of interstellar exploration were established. Gliese 86 (a KO star) became the jump-off point to Gliese 59 (G8) and to Tau¹ Eridani (F6). It is not clear to Marjorie why Gliese 86.1, 95, and Kappa Fornacis – all G or early K dwarfs – were bypassed, but she points out 86.1 is a K2 star and therefore not a "Group 1" candidate for intelligent life, while the other two might have peculiarities not yet detected by earth astronomers, such as variability; or they might be recent arrivals on the main sequence; or perhaps both deficiencies are present.

The Gliese 67 branch, connecting a total of six stars, represents what appears to be the deepest penetration of space by the Reticulans from their home star. The route spans 78 (± 2) light years or 24 parsecs! Of course, it is possible, as Ms. Fish suspects, that the volume depicted in the star map is only one of several volumes of space explored by the Reticulans!

SUMMARY AND CONCLUSIONS

Much credit for escalating my interest in Marjorie Fish's work goes to Robert J. Durant, Assistant Editor of *Pursuit*, quarterly journal of the Society for the Investigation of the Unexplained (SITU). Durant "ghosted" an excellent article for SITU regarding Marjorie's research. In November of 1973 he paid me a visit and later forwarded copies of his *Pursuit* story (Jan., 1974 issue) and a provocative *Saga* article by Friedman and Slate (July, 1973 issue). Finally, on July 18, 1974, I spent six hours with Ms. Fish discussing her work and viewing her models. Returning with copies of some of her voluminous notes and photographs, I checked her data in six star catalogs and found no errors. I am satisfied her investigations

have been carried out in a completely thorough, scientific manner.

Although initially Marjorie believed the models would reveal many star patterns similar to the one in Betty's map, only one select group turned up after years of painstaking study. She feels the pattern in her model and in the map are one and the same, and moreover she is satisfied her work has ruled out a hoax and coincidence. I must agree the reasons she cites are compelling. From my own personal inspection of the model, I can attest the star pattern in the model does indeed match amazingly well the one in the map. The presence of the prominent background triangle lends strong additional support.

The few discrepancies between the map and the model are rather minor and, in my view, are logically accounted for by Ms. Fish. Even Betty's two erasures, which match the correct angle and length for the Gliese 86 line, help to build a case for the pattern's reality.

Most impressive is the fact the 12 network stars fulfill all required exobiological criteria – that is, all are single, non-variable, slowly rotating, late F-to-early K main-sequence dwarfs with stable lifetimes of at least three to four billion years. The lines in the map connect stars that are *solely* candidates for life. Furthermore, all but one of the stars are possible sources for *intelligent* life (8 of the 12 are optimum G stars including the suspected origin star itself which is the same spectral type as our sun); the pattern is composed of an abnormally high number of all the known life-supporting candidates in the solar neighborhood; all the life-supporting stars found within the Hill volume are included in Betty's map; and the lines in the map represent a logical travel sequence from star to star.

It is extremely significant that the background triangle was not known to exist when Betty Hill drew her map in 1964. One of the stars was not even listed in catalogs at that time. In addition, based upon Mrs. Hill's nonscientific experience and limited knowledge of the heavens, it appears highly improbable she had the capability to devise a unique pattern of a dozen life-supporting stars.

For all of these reasons, Marjorie believes and I tend to agree, that the evidence appears to eliminate both fabrication and coincidence. It is just possible that Ms. Fish has achieved a stunning breakthrough with enormous implications for UFO research, exobiology, and astronomy – not to mention the cultural impact. If the Hill map was drawn as the result of contact with extraterrestrial beings, a whole series of exceedingly important facts are immediately evident: (1) the reported abduction of Betty and the late Barney Hill represents reality not fantasy; (2) the

map is evidence of interstellar visitation and indicates the origin of at least some UFOs; (3) the map, together with the Hills' testimony, provides valuable clues about the abductors, their probable home star, their planetary environment, their sequence of space travel between stars, and something about the actual abundance of life-bearing stars in the sun's vicinity.

If this is correct, we may conjecture that we are "dealing" with a very old and incredibly experienced galactic culture which has crisscrossed the vast spatial seas for probably thousands, perhaps millions of years in starships that, to us, are "indistinguishable from magic" (A. C. Clarke). Such an advanced race – apparently capable of manipulating mental, electrical, and other forces in a manner we are powerless to comprehend – would so far surpass our own technology it might very well have little interest in communicating with us and nothing to gain by it.

Even ignoring the stupendous UFO implications of Ms. Fish's accomplishments, her models stand on their own merit as detailed representations of the solar neighborhood. Conceivably, the models may reveal new data regarding local stellar distribution. For example, Marjorie has observed that hot, bright A stars in the sun's vicinity form a plane. Other types cluster in separate groups – G and early K's in one group; late K and early M's in another; late M's, white dwarfs, and some subdwarfs in still another cluster; and double stars in a curved band. The sun's somewhat isolated position in space has already been mentioned.

Astronomers and exobiologists everywhere owe a debt to Ms. Fish, a former elementary schoolteacher who accepted a challenge to science that was not met by professionals – in my judgment, a tragic indictment of the science community. Although she received some help on non-UFO aspects of her research from several astronomers – most notably, Walter Mitchell of Ohio State University – most scientists are either totally unaware of her considerable achievement or choose to disregard it altogether. So far the only professional recognition of Marjorie's work has come from Ohio State's Department of Astronomy, where her 10-parsec model has been used for student study for five years. Northwestern astronomer and director of the Center for UFO Studies, J. Allen Hynek, also has a few of the Fish models but has not yet offered a formal evaluation statement. Finally, David R. Saunders, former member of the Colorado UFO Project, reproduced the Hill star map on a computer, using the Fish data.

Though thus far unappreciated by the scientific community, Marjorie's (See Analysis – Page Seven)

Analysis

(Continued from Page Six)

prodigious research will continue. Last summer, she delivered papers at the Fifth APRO UFO Symposium, Pottstown, Pennsylvania, and at the Fifth Annual MUFON UFO Symposium, Akron, Ohio. She now is preparing to construct an even more precise, larger scale model of the nearby stars.

Someday confirmation of Ms. Fish's discoveries could be forthcoming. CETI itself has gained a new respectability. A just completed radio-telescope search by Zuckerman and Palmer examined some 500 stars for artificially generated signals at 21 centimeters (the results have not yet been published). Even though it is possible most space communications occur via direct spaceflight and not by radio transmission, an effort should be made to scan Zeta¹ Reticuli and other stars in the Hill pattern for intelligent signals. While the fixed 1000-foot antenna at Arecibo, Puerto Rico, can acquire only a few of the Hill stars, the Australian radio telescopes are at the right latitude to examine them all.

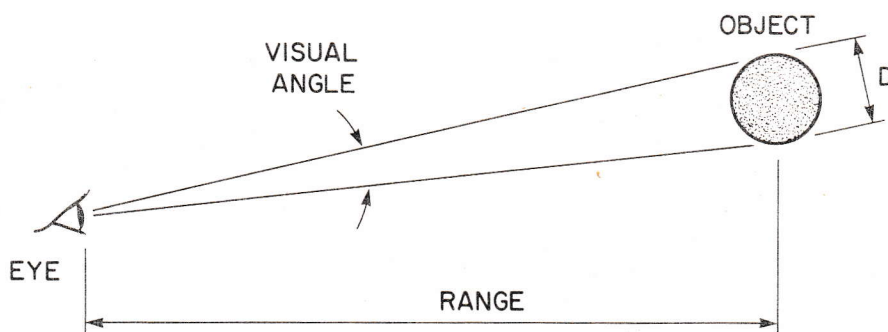
In conclusion, I wish to point out the bulk of this report is a presentation and interpretation of Marjorie Fish's own results. My contributions were limited to supplementing her findings with additional astronomical data, to writing what I hope was a credible "interstellar scenario" based upon her results, and to offering my evaluation of those results.

ANGULAR SIGHTING ESTIMATES AND MEASUREMENTS* (Part II)

Richard F. Haines, Ph.D.

This is the second in a series of articles on the subject of standardization of terms and concepts related to the visual perception of unidentified flying objects (UFO). Whereas the first article dealt with some of the optical properties of aerial objects and various atmospheric effects that can influence the visual detection and identification of them, this article will concentrate upon making angular estimates and measurements of aerial objects. Although it is difficult to prove, I believe that visual *estimates* of an object's size and/or subtended angle *made during* a UFO sighting will be more accurate than will *angular measurements made after the fact* using accurate instruments but based upon the memory of the event. Nevertheless, both subjects will be discussed here.

Let us begin, then, with the important concept of the "Visual Angle" (hereafter referred to as VA). Figure 1 illustrates this concept. If the distance (i.e., range) between the eye and the object and some dimension (D) of the object are known, the VA can be calculated by using simple trigonometry (reference 1). Since many objects are not round, it becomes



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necessary to take note (perhaps by making a simple sketch) of the object's dimension for the VA one is trying to determine.

Unfortunately, the distance and/or the dimensions of UFOs are (usually) not known and must, therefore, be estimated. When other previously experienced objects are also present within the field of view (along with the UFO) like a house, automobile, telephone pole, aircraft, humans can make relatively accurate angular (*not object size*) comparisons. Many laboratory studies have shown the near impossibility of judging the actual size of a UFO in the absence of visual cues provided by known objects! There are various visual cues for estimating range like *aerial perspective* (i.e., loss of visual detail due to haze, etc., in the atmosphere); *linear perspective* (parallel lines and equi-distant points appear to recede to a common point with distance); *object size* (e.g., a semi-trailer truck must be farther away than an automobile when both subtend the same VA); *interposition* (an overlapping object is perceived as being nearer than an overlapped object); *visual accommodation* (the focal power of the lens inside the eye changes with object distance); *binocular convergence* (this coordinated turning of both eyes to fixate an object may provide distance information up to about 20 yards); etc. (consult reference 2 for further information on this subject). If neither the distance nor some dimension of an object can be estimated, its VA can still be estimated with relatively good accuracy using the direct visual comparison techniques offered below. Several other terms must be discussed first, however.

The term "Slant range" is simply the distance between the eye and the object when one is at a different altitude from the other. Just the term "range" is more commonly used. "Altitude" is a word that may refer to the height of an object above sea level or the Earth's surface (this is the preferred definition given in reference 3) or it may stand for the VA from object to eye to the horizon. I

would suggest that the term "elevation angle" be used for this second usage. "Azimuth" is the horizontal counterpart of "elevation angle." Zero degrees azimuth is the compass direction (bearing) on the horizon directly below the North (pole) star "Polaris," measured to the observer's right. Therefore, the position of an object in the air is characterized by an azimuth and elevation angle from the observer's position. Both of these angles may change at another observer's position even though the same object is viewed at the same instant. Trigonometric "triangulation" calculations may be made (like those made in forest ranger fire-watch stations) to determine the position of a UFO in the air if: (1) azimuth and elevation angles are obtained on the object simultaneously, (2) the two (or more) observation positions are known, and (3) certain angular measurement accuracies are achieved. Many other astronomical words used in the UFO literature (e.g., "latitude," "longitude," "nadir," "hour angle," etc.) are also important to know but are beyond the scope of this brief article. The interested reader should consult reference 4 or another basic astronomy text for these and other terms and definitions.

Returning to Figure 1, the smallest VA the normal human eye can resolve without the aid of magnification lenses or artificial pupil(s) is about one minute of arc (i.e., 1/60th of a degree arc). People who are nearsighted (or farsighted) can resolve somewhat larger (smaller) angles than this, respectively, without corrective lenses (reference 5).

Making Angular Estimates. A useful angular referent that is sometimes available in the sky is the *full Moon*; its diameter is 32 minutes of arc. The maximum visible dimension of the Moon during earlier or later phases is *not* a useful angular referent, however, for reasons that are too involved to explain here. Other very useful angular reference points are stars visible during clear nights. It is (potentially) useful to know the

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Estimates

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names and locations of the major constellation stars because the VA from one to any other star is known or can be calculated with great precision. So by carefully noting which stars a UFO passed during a given period of time, its position and apparent velocity can be "reconstructed" by others later. Use of a "Sky Map" such as is provided in the "Recommended Procedures for APRO Field Investigators" (form no. 1-Ag69) is extremely useful for both day and nighttime sightings. But angular accuracies no greater than about five degrees arc will be possible without the aid of angular measurement instruments like those to be discussed.

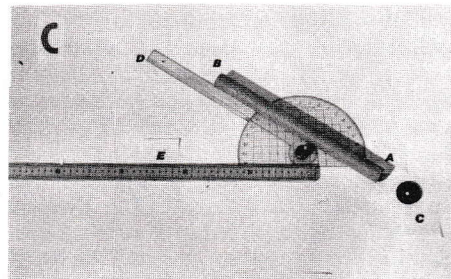
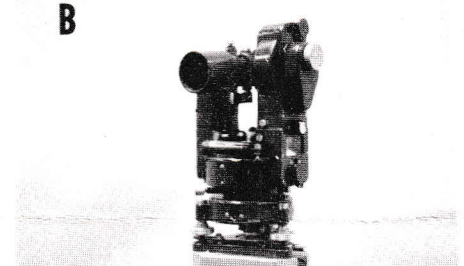
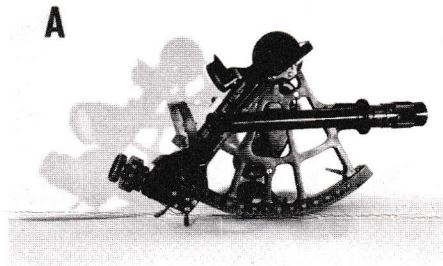
Another fairly useful angular referent is your thumb or a finger. If you intend to rely upon the apparent angular width (i.e., the VA) of your thumb, for instance, with your arm fully outstretched, you should follow the "calibration" procedure given here: (1) stand some fixed distance (D) from a wall holding your thumb 90 degrees arc to your line of sight and arm stretched horizontally in front of you, (2) have someone who is standing near the wall mark where your line of sight strikes the wall both *above* and *below* your thumb, (3) repeat this about five (or more) times to obtain an average thumb-equivalent height (h) on the wall, and (finally) use a trigonometry *tangent* function (reference 1) to determine your thumb's VA. Here are a few representative VAs for a fixed D = 20 feet. (h = 9", VA = 2° 9'); (h = 9.5", VA = 2° 16'); (h = 10", VA = 2° 23'); (h = 10.5", VA = 2° 30'). Keep in mind that there is no clear-cut dividing line between estimating angles and measuring them.

My own research has shown me something else of importance. It is the necessity of keeping separate those terms that deal with the physical (stimulus) world from those that deal with the psychological-subjective (response) world. Thus, I reserve the term "form" for describing the physical configuration of boundaries of real objects and the term "shape" for describing the object's perceived configuration. Many examples could be given where a single form has many different shapes and vice versa! (reference 6, 7). A study of physiological optical principles will convince the most sceptical reader of the importance of determining "form" details whenever possible. Yet the usually short-lived nature of UFO phenomena makes this difficult or impossible. We are usually left with fleeting impressions (memories) and sometimes visual after-images of something that seemed almost unreal. This is one reason why photographic "evidence" of UFOs is so valuable. Not only are photographs of UFOs more concrete than are subjective experiences,

they are also subject to many different kinds of analysis after the fact.

Regarding the perception of object shape, the human eye is fairly accurate in estimating the ratio of maximum to minimum dimensions of regular shapes like ellipses, rectangles, etc. (reference 7). Nevertheless, various shape illusions may occur if the object is an irregular shape so that the eye is fooled into making unfounded assumptions about the nature of the object. The trained UFO field investigator should be aware of the general conditions that can "trick" the eye. Two technical references that deal with illusions are references 8, 9.

Making Angular Measurements. Accurate instruments have been available for centuries with which to measure the VA between two objects (usually stars). Figure 2 shows some of these instruments. A standard marine sextant is shown in (A) and a theodolite in (B). These (usually expensive) instruments can measure angles down to about 2 minutes of arc and 4 seconds of arc, respectively. A second of arc = 1/60th of a minute arc.



Relatively inexpensive plastic sextants are now available with claimed angular accuracies of about 2 minutes arc¹. A homemade "sextant" may also be made from simple parts like those shown in (C) of Figure 2. A 0.75" diameter cardboard tube 12" long (A-B) was glued to the plastic "swing-arm" of a drafting protractor (D). A straight meter stick (E) was then attached to the flat base of the protractor. An eye piece cap (C) with 0.125" diameter hole was added at the viewing end of the tube. The VA subtended by the field of view through this tube would be 3° 34' 34" arc and the protractor can be read to an accuracy of about 20 minutes of arc! Because one of the largest sources of measurement error is movement of the instrument during sighting, a tripod (fence post, telephone pole, etc.) should be used to help stabilize the two lines of sight. When the field

investigator uses an angular measurement device, the critical angles, distances, and traverse times of a UFO can be reconstructed in the field with the UFO observer present to "work through" the events of his sighting.

Another useful field instrument yields an "artificial horizon." Called a "builder's level," this sighting instrument makes it possible to determine where the horizon is in poor visibility like fog or rain or in hilly country. Instead of buying a builder's level, a "T" square and plumb bob could be attached to one's homemade sextant so that the flat base of the protractor is 90 degrees arc to the plumb bob string (making it level). Developing one's own field instruments is an enjoyable area that calls for ingenuity and creativity.

Because there is an error associated with every visual sighting made, I will conclude with a word about measurement error. In addition to attempting to reduce angular sighting errors by becoming practiced in taking the measurements, it is also important to ascertain both the

angle and your error of measurement. Whenever possible, take several measurements on the same object (even if it involves a reconstruction of the events after the fact) and then average them. Then cite in your report the average VA as well as the maximum and minimum values obtained. Other statistical formulae are also available to describe the amount of sighting variability (scatter) around the average value but this subject is beyond the scope of this article. Consult reference 10 for such information. As a useful general rule

—AVOID THE INDISCRIMINATE

USE OF ABSOLUTE
MEASUREMENT TERMS—

Most readers will raise their eyebrows if they read "... the object was exactly 1.673 miles away from me," or "... the width to length ratio of the oval object (See Estimates – Page Nine)

Estimates

(Continued from Page Eight)

was 0.8001." Such statements are not only misleading but stretch the speaker's credibility. Yet such precise values may well be justified if obtained by trained persons using instruments capable of achieving such accuracy. In general, however, it is better to use such words as "about," "approximately," and "plus and minus." If you do, your reports will be more useful to those who may want to scientifically evaluate their contents. If the area of UFOlogy is ever going to gain the respect that it deserves, more precise and consistent usage of terminology will be required. I hope that this article has helped in this regard.

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Footnote

- ¹Edmund Scientific Company, catalog number 71,421. No personal endorsement for this particular device is implied by the author or by A.P.R.O.

**Please Send Address
Changes**

Catalina

(Continued from Page One)

the UFO retained its apparent oval-disc shape (looking much like an "M&M candy"). In addition, the object showed no fins or any other apparatus, as would be expected on a blimp, and also the speed was too great for a blimp.

The photographer almost didn't get his film — by the time he decided to photograph it, the UFO was passing directly past the southern tip of Santa Catalina island, and thus only a few seconds of footage was obtained. The filming sequence was abruptly aborted when the photographer could no longer follow the UFO along its flight path because the view to the right became obstructed by the helicopter's own structure. The pilot was not aware of the UFO as he was facing away from the object, and the photographer was strapped into his seat and had no way of communicating with the pilot.

Analysis of the film by UFO experts and professional photographers has convinced many of them that it is a "genuine" UFO and not any kind of misinterpreted natural or man-made phenomenon. They point out that the UFO demonstrates a clearly defined shadow underneath while at the same time the sun is strongly reflected from the upper side of the craft. No wings, fins, or exhaust of any kind is visible, but there does seem to be some kind of disturbance of the air immediately around the object.

With the distance from the helicopter to the UFO established, and with the UFO seen clearly passing in front of Santa Catalina mountains of known height, it has been possible to estimate the UFO's size as approximately 200 feet in diameter and its speed as "faster than a small private plane but slower than a jet."

The filmclip, revealed publicly for the first time at the SDUFORO meeting, has remained virtually "hidden" from UFO investigators until very recently when a friend of the photographer, who had seen the filmclip in a private showing in 1966, remembered the film and mentioned to the photographer that SDUFORO might have an interest in seeing it.

The photographer at first declined, but later changed his mind and granted permission for the filmclip to be viewed.

The filmclip was shown nationally for the first time recently when it was shown along with other introductory material prior to the television debut of "The Disappearance of Flight 412."

The original copy of the film is currently being analyzed by technicians using computers to "enhance" the film's quality by superimposing the filmclip's photo frames into one composite photograph.

However, the enhancement project has been hampered by low priority time with computers, so results from this analysis may not be available for several more months.

If the data from this analysis proves to be positive, there is little doubt this filmclip will be one of the single most important pieces of evidence in history for the physical reality of UFOs.

Prints from this filmclip are currently unavailable because copies of the filmclip are under analysis, but the APRO *Bulletin* hopes to publish a print as soon as one becomes available.

NBC

(Continued from Page One)

inquiring about membership took the time to look up our mailing address in various books before writing. Few books have been published on the subject in the past eight years which do not mention APRO.

The general content of the special seemed to be disjointed — it was not clear who saw what or when. However, it is felt at Headquarters that the essence of the UFO organizations was accurately portrayed.

By way of identification, the young lady seated at the desk with Mrs. Lorenzen was Mrs. Sheila Kudrle, our office manager. The gray-haired lady operating the postage meter was Mrs. Madeleine Cooper, APRO's membership secretary. The dark-eyed, dark-haired young lady in sailor dress posting reports was Mrs. Sue Hutchinson, one of our volunteer file clerks, and the blonde lady typing was Mrs. Elizabeth Darr, our clerk-typist.

All in all, APRO's staff felt that the coverage of APRO was very good and although not identified as such, the U. S. map with colored pins depicted the distribution of APRO Field Investigators and Consultants in this country.

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